

Airly Mine Subsidence Management and Monitoring

Centennial's Airly Mine is based near Capertee, 40 kilometres northwest of Lithgow. Located on the northern fringe of the Western Coalfields, Airly is partly within the Mugii Murum-ban State Conservation Area. Operating since 2009, Airly employs 130 people and produces up to 1.8 million tonnes of coal annually, predominantly for the domestic market.

Development consent and modifications

On 15 December 2016, Airly Mine received State Significant Development (SSD 5581) consent to operate an underground coal mine using partial extraction techniques. The consent allows for coal mining from the Lithgow Seam at the rate of 1.8 million tonnes per annum. The mine is approved to operate 24 hours per day, seven days per week, for 20 years from the date of commencement, followed by rehabilitation. The consent will lapse on 31 January 2037.

Since SSD 5581 was granted, the consent has been modified twice. The first modification allows for (three parts):

- Constraints on proximity of panel and pillar mining adjacent to cliffs.
- Constraints on pillar splitting and quartering operations in areas downslope of cliffs in the Partial Pillar Extraction Zone.
- No second workings within the 26.5-degree angle of draw plus 50 metres from the limit of the New Hartley Shale historic workings.

The second modification allows Airly to receive up to 170 megalitres of water per year, via rail, from Charbon Colliery.

Elevated subsidence

In January 2020, Centennial observed ground movements above the original prediction of no greater than 125 millimetres. Vertical subsidence was at up to 185 millimetres in some areas. Visual inspections undertaken at that time did not reveal any surface fractures.

The first surface fracture was identified on 7 July 2020. The New South Wales Department of Planning, Industry and Environment (DPIE) has since been notified of additional surface fractures in February 2021, June 2021 and September 2021. The maximum recorded subsidence on Mount Airly was 713 millimetres.

Immediate response

Centennial engaged Mine Subsidence Engineering Consultants (MSEC) to undertake an independent review and conduct a visual inspection over Mount Airly. MSEC assessed whether there have been subsidence impacts near the first three previously extracted miniwall (MW) panels.

Centennial engaged Strata Control Technology (SCT) to review the existing subsidence model, assess the causes of deviations from previous forecasts and update predictions for future mining at Airly based on a numerical modelling approach.

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These assessments determined that increased subsidence at Airly is caused by the fracturing and compression of strata above the chain pillars. This is primarily a function of weak strata, abutment load, reduced confinement due to the adjacent goaf voids, and pillar width.

Adaptive management

In response to the increased subsidence, Centennial has reviewed Airly's mine design. Actions taken to limit subsidence to 125 millimetres at MW11 and MW12 included:

- Developing a 60-metre wide maingate pillar in MW10.
- Developing a 40-metre wide maingate pillar between MW11 and MW12.

Following extraction of MW11 and MW12, measured subsidence above these panels was under 125 millimetres, in line with SCT's predictions and within the Development Consent limit.

Point Hatteras

Centennial has modelled various pillar sizes and pillar size combinations for its extraction plan to mine below Point Hatteras. This modelling assessment indicated that a consistent pillar width of 70 metres and extraction height of 2.8 metres was the most appropriate mining geometry for the 61-metre wide panels at Point Hatteras. The numerical modelling approach used for mine design was consistent with that successfully used for MW11 and MW12. The Point Hatteras Extraction Plan was prepared in consultation with the Airly Independent Expert Panel and approved by DPIE in December 2021.

Mining under Point Hatteras has proceeded based on increased pillar sizes (to 70 metres). This enables Centennial to control the fracturing in the strata above the pillars, therefore maintaining the surface subsidence at Mount Genowlan to within the 125-millimetre limit and mitigate the risk of cracking. This conservative mine design means the subsidence performance criteria will be achieved. Surface subsidence monitoring will validate the mine design and allow for mining to be stopped before subsidence exceeds the maximum allowable limit, as per the approved Extraction Plan.

Controls

Centennial will mine MW13, MW14, MW15A, MW15B and MW16 under Point Hatteras. Mine subsidence and impacts will be assessed on an ongoing basis and will be dependent on subsidence being maintained at under 125 millimetres. Additional subsidence monitoring will be undertaken to provide an appropriate early warning for potential exceedance of subsidence thresholds. Furthermore, extraction of the southern portion of MW15A and the length of MW15B is contingent on Airly demonstrating that subsidence levels and trends are within predictions.

Contact

Our mine sites offer a complaints line in accordance with each mine's Environment Protection Licences. We operate our mines to minimise the environmental footprint, however, we welcome any enquiries and feedback from the community and make a commitment to respond promptly.

You can contact Airly directly on +61 2 6359 2100 or info.airly@centennialcoal.com.au, and you can access the Airly community information and complaints hotline on +61 2 6359 2108.